THE FOOD OF THE GIANT TOAD, BUFO MARINUS (L.), IN TRINIDAD AND BRITISH GUIANA WITH SPECIAL REFERENCE TO THE ANTS

BY

NEAL H. WEBER

REPRINTED FROM
ANNALS OF THE ENTOMOLOGICAL SOCIETY OF AMERICA
Vol. XXXI, No. 4, December, 1938

THE FOOD OF THE GIANT TOAD, BUFO MARINUS (L.), IN TRINIDAD AND BRITISH GUIANA WITH SPECIAL REFERENCE TO THE ANTS

NEAL A. WEBER,
University of North Dakota,
University Station, North Dakota

The most conspicuous amphibian in Trinidad and British Guiana is the giant toad, *Bufo marinus* (L.), largely because of its size and because it often frequents the vicinity of dwellings in its search for food. In the West Indies and Trinidad it has been reported feeding on mole-crickets, leaf-caterpillars (*Mocis repanda*), ducklings, and rats (Myers, 1931, p. 25). Barbour (1930, p. 76) states that "this species feeds upon small batrachians, and may extirpate some native species."

The following study is based upon the examination of stomach contents of 26 specimens, of which four from Mt. St. Benedict, Trinidad, were given to me by Mr. Desmond Vesey-Fitzgerald and the rest were taken by myself at St. Augustine, Trinidad and at the Forest Settlement, Mazaruni River, British Guiana; I have added two feeding records observed by myself.

In the stomachs of these toads no young rats or ducklings were present, only a single mole-cricket, a single caterpillar, and a single frog were found, each in but one stomach, and ants proved to be by far the most important source of food, qualitatively and quantitatively. Mole-crickets, caterpillars, and smaller batrachians were all abundant in the localities in which the toads were collected. 35 species of ants were determinable and ants were present in all but two stomachs, one of which was completely empty. They constituted the bulk of all food in 16 stomachs or 76 per cent of the stomachs of which a complete analysis could be made.

Among the ants were included common species of those localities, *Ectatomma ruidum*, found in 16 out of 18 Trinidad stomachs (and themselves constituting the bulk of all food in eight stomachs), *Odontomachus haematoda*, found in six stomachs, and *Pheidole fallax jelskii*, found in ten stomachs. Other common but very small ants, *Cyphomyrmex rimosus* and *Wasmannia auropunctata*, were found, in six and in four stomachs, respectively. Additional noteworthy ants include

the army ants of three species, including *Eciton burchelli* var. *urichi*, one of the largest and most powerful army ants of the New World. In one stomach were found two workers of *Pseudomyrma elegans*, the only terrestrial species of this great arboreal genus. Ants of three other arboreal genera were included in the diet of the toads. The single alate female of *Procryptocerus goeldii guianensis* probably had descended to the ground after her marriage flight. The single worker of *Cryptocerus varians* had undoubtedly descended to the ground from its nest in a saman tree (*Pithecolobium saman*) close to where I took the toad. The numerous workers of *Cephalotes atratus quadridens* were similarly nesting in nearby saman trees and it is the habit of the workers of this species to forage both on trees and on the forest floor. In snapping up these spinose ants the toads inadvertently trapped and swallowed the staminate flowers of the saman trees which formed an appreciable part of the contents of two stomachs. There are twelve records of fungus-growing ants (*Attini*) of four genera, *Cyphomyrmex*, *Trachymyrmex*, *Acromyrmex*, and *Atta*. The two latter genera are of especial interest because the leaf-cutting activities of their workers are of considerable importance to tropical agriculture.

Snails were found in five stomachs. Spiders, present in eight stomachs, constituted the bulk of the food in one stomach and an appreciable fraction in the others. Millipedes, found in four stomachs, constituted the bulk of the contents in two. Termites, in six stomachs, constituted the bulk of the contents in one. The body contents of these soft-bodied insects are so readily expressed in the toad stomach that the real bulk must be appreciably larger than the bulk as found, which was entirely of collapsed specimens. An additional Trinidad record is of winged termites captured at mid-day during a rain.

The remainder of the food was divided among seven additional insect orders and Hymenoptera exclusive of Formicidae (a single mutillid). Single specimens of Mantodea, Lepidoptera, and Diptera were found. Specimens of Blatteriae (roaches) found in two stomachs, of Orthoptera and Hemiptera in three, and of Coleoptera in 14 stomachs accounted for the remainder of the food. Only one or several beetles, adult or larval, were found in any stomach and in no case did they constitute the bulk of the stomach contents.

The giant toad is largely crepuscular or nocturnal in habit though sometimes it comes out during heavy diurnal rains

to catch the insects beaten down by the rain drops, or appearing in numbers following the cessation of rain and their forced quiescence. Consequently the prey of the ants must be largely crepuscular or nocturnal since the toads take only moving objects. Most of my collections were made a number of hours after dark and the prey was obviously freshly taken as indicated by the lack of digestion. Other collections were made several hours after sunrise but these toads were resting under stones and their stomach contents had clearly been partly digested.

A comparison of the ant food of *Bufo marinus* with the ant food of five different species of *Bufo* taken in the Belgian Congo (Bequaert, 1922, pp. 289–290) shows similarities in feeding habits which may be summarized in the following table:

	Stomachs Examined	Ant Species	Dorylinae	Ponerinae	Pseudomyrminae	Myrmicinae	Formicinae
Congo Bufo spp.	194	72	8 %	42%	.....	22 %	27%
Bufo marinus	28	35	8.6%	20%	2.9%	48.6%	20%

The Dorylinae and Formicinae percentages are similar while the Ponerinae and Myrmicinae percentages are reversed. It should not be inferred that terrestrial Myrmicinae are relatively more abundant in the Neotropical Region. Rather the explanation probably lies in the fact that the *Bufo marinus* toads were mostly collected in clearings where Ponerinae species are relatively less abundant, *Ectatomma* and *Odontomachus* being conspicuous exceptions. The presence of Pseudomyrminae in *B. marinus* is due to the single terrestrial neotropical species while the species of this sub-family in Africa seem to be all arboreal. The absence of Dolichoderinae in both groups is noteworthy. Most of the neotropical species are arboreal and the terrestrial species are small or diurnal.

LIST OF CONTENTS OF STOMACHS OF BUFO MARINUS

Ants

	Locality	*Date*[1]	*Toad Stomachs*
1. *Eciton burchelli* West. var. *urichi* Forel	Trinidad	[2]	1
2. *Eciton* (*Acamatus*) *ierense* Weber	Trinidad	Mar. 22	1
3. *Eciton* (*Acamatus*) *postangustatum* Borgmeier	B. Guiana	Aug. 19	2

[1]All dates are in 1935.
[2]D. Vessey-Fitzgerald, collector.

	Locality	Date	Toad Stomachs
4. *Ectatomma ruidum* Roger	Trinidad	Mar. 19, 22	16
	Trinidad	[2]	
5. *Gnamptogenys sulcatum* (F. Sm.) ssp. *bufonum* Weber	B. Guiana	Aug. 30	1
6. *Holcoponera striatula* Mayr	B. Guiana	Aug. 30	1
7. *Pachycondyla harpax* Fabr	Trinidad	Mar. 19, 22	5
	Trinidad	[2]	
	B. Guiana	Aug. 30	
8. *Anochetus inermis* Ern. André	Trinidad	Mar. 19, 22	2
9. *Odontomachus haematoda* L.	Trinidad	Mar. 19, 22	6
	Trinidad	[2]	
10. *Odontomachus haematoda* ssp. *insularis* Guerin	Trinidad	Mar. 22	1
11. *Pseudomyrma elegans* F. Smith	B. Guiana	Aug. 30	1
12. *Pheidole* spp	Trinidad	Mar. 22	3
	B. Guiana	Aug. 19	
13. *Pheidole fallax* Mayr ssp. *jelskii* Mayr	Trinidad	Mar. 22	10
	B. Guiana	Aug. 30	
14. *Crematogaster* (*Orthocrema*) *brasiliensis* Mayr ssp. *arawak* Weber	B. Guiana	Aug. 30	1
15. *Crematogaster* sp	B. Guiana	Aug. 30	1
16. *Monomorium* sp	B. Guiana	Aug. 30	2
17. *Tranopelta gilva* Mayr[3]	Trinidad	July 11	Many
18. *Solenopsis* sp	Trinidad	Mar. 19, 22	4
	B. Guiana	Aug. 30	
19. *Solenopsis* (*Diplorhoptum*) *altinodis* Forel	Trinidad	Mar. 22	1
20. *Solenopsis geminata* Fabr	Trinidad	Mar. 22	2
21. *Wasmannia auropunctata* Roger	Trinidad	Mar. 22	4
	B. Guiana	Aug. 19, 30	
22. *Procryptocerus goeldii* Forel ssp. *guianensis* Weber	B. Guiana	Aug. 30	1
23. *Cryptocerus* (*Cyathomyrmex*) *varians* F. Smith	Trinidad	Mar. 22	1
24. *Cephalotes atratus* L. ssp. *quadridens* DeGeer	Trinidad	Mar. 22	3
25. *Cyphomyrmex rimosus* Spinola	Trinidad	Mar. 22	6
	B. Guiana	Aug. 19, 30	
26. *Trachymyrmex urichi* Forel	Trinidad	Mar. 22	2
27. *Acromyrmex octospinosus* Reich	Trinidad	Mar. 22	2
	Trinidad	[2]	
28. *Atta sexdens* (L.)	B. Guiana	Aug. 19	2
29. *Brachymyrmex cordemoyi* Emery	B. Guiana	Aug. 19, 30	2
30. *Paratrechina longicornis* Latr	Trinidad	Mar. 22	1
31. *Nylanderia* sp	B. Guiana	Aug. 19	1
32. *Campanotus* spp	Trinidad	Mar. 22	1
33. *Camponotus* (*Myrmothrix*) *abdominalis* Fabr	Trinidad	Mar. 22	2
34. *Campanotus* (*Myrmothrix*) *rufipes* Fabr	B. Guiana	Aug. 30	2
35. *Campanotus* (*Myrmobrachus*) *crassus* Mayr	Trinidad	Mar. 22	1

Animals Other Than Ants

1. *Mollusca-Gastropoda*—unident. snails	Trinidad	Mar. 22	5
	B. Guiana	Aug. 19, 30	
2. *Arachnida*—unident. spiders and phalangids of many sizes	Trinidad	Mar. 22	8
	B. Guiana	Aug. 30	
3. *Diplopoda*—unident. millipedes	Trinidad	Mar. 22	4
	B. Guiana	Aug. 30	

[2]D. Vessey-Fitzgerald, collector.
[3]Swarm of winged castes captured by numerous toads.

	Locality	*Date*	*Toad Stomachs*
4. *Orthoptera*—Acrididae nymph	Trinidad	Mar. 22	1
5. *Orthoptera-Gryllotalpidae-Scapteriscus vicinus*[4]	Trinidad	Mar. 22	1
6. *Orthoptera-Tettigoniidae* nymph	Trinidad	Mar. 22	1
7. *Blattariae—Epilampria abdomenigrum* (DeG.) det. Rehn	Trinidad	Mar. 22	2
8. *Mantodea*—small mantid	B. Guiana	Aug. 30	
9. *Isoptera*—termite worker remains	Trinidad B. Guiana	Mar. 22 Aug. 30	6
10. *Isoptera*—swarm of winged castes[5]	Trinidad	July 9	Many
11. *Hemiptera-Pentatomidae*—large adults in fragments	Trinidad B. Guiana	Mar. 22 Aug. 19	2
12. *Hemiptera*—adults and nymphs in fragments	B. Guiana	Aug. 30	1
13. *Lepidoptera*—small larva	Trinidad	Mar. 22	1
14. *Diptera*—1 mosquito	B. Guiana	Aug. 30	1
15. *Coleoptera*—various beetles in fragments and larvae	Trinidad B. Guiana	Mar. 22 Aug. 19, 30	11
16. *Coleoptera—Opatrinus* sp. det. Darlington	Trinidad	Mar. 22	1
17. *Coleoptera—Sphenophorus* sp. det. Darlington	B. Guiana	Aug. 30	1
18. *Coleoptera—Elateridae*—one adult	Trinidad	Mar. 22	1
19. *Coleoptera—Distichus* sp. det. Darlington	B. Guiana	Aug. 19	1
20. *Hymenoptera—Mutillidae—Hoplomutilla* n. sp. det. Mickel	Trinidad	Mar. 22	1
21. *Amphibia*—partly digested small frog	Trinidad	Mar. 22	1

[4]The destructive mole-cricket of Trinidad.

[5]Identified by Dr. A. E. Emerson as *Anoplotermes* sp. near *banksi* and two new species of same genus.

REFERENCES CITED

Barbour, T. 1930. Some faunistic changes in the Lesser Antilles. Proc. New England Zool. Club 11: 73–85.

Bequaert, J. 1922. The predacious enemies of ants. Bull. Amer. Mus. Nat. Hist. 45: 271–331, Pl. I, XXIV, XXV.

Myers, J. G. 1931. A preliminary report on an investigation into the biological control of West Indian insect pests. Empire Marketing Board Publication 42, 1–173, 2 maps (London).